

#5



SEQUENCE LISTING

<110> Maxygen Aps; Maxygen Holdings

<120> Protein C or activated protein C-like molecules

<130> 0219us410 - protein C

<140> US 09/997,623

<141> 2001-11-29

<150> US 09/978,917

<151> 2001-10-17

<160> 48

<170> PatentIn Ver. 2.1

<210> 1

<211> 1383

<212> DNA

<213> Homo sapiens

<220>

<221> CDS

<222> (1)..(1383)

<221> sig_peptide

<222> (1)...(126)

<221> mat_peptide

<222> (127)..(1383)

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Met Trp Gln Leu Thr Ser Leu Leu Leu Phe Val Ala Thr Trp Gly Ile	
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tcc ggc aca cca gct cct ctt gac tca gtg ttc tcc agc agc gag cgt	96
Ser Gly Thr Pro Ala Pro Leu Asp Ser Val Phe Ser Ser Ser Glu Arg	
-25 -20 -15	

gcc cac cag gtg ctg cgg atc cgc aaa cgt gcc aac tcc ttc ctg gag	144
Ala His Gln Val Leu Arg Ile Arg Lys Arg Ala Asn Ser Phe Leu Glu	
-10 -5 -1 1 5	

gag ctc cgt cac agc agc ctg gag cgg gag tgc ata gag gag atc tgt	192
Glu Leu Arg His Ser Ser Leu Glu Arg Glu Cys Ile Glu Glu Ile Cys	
10 15 20	

gac ttc gag gag gcc aag gaa att ttc caa aat gtg gat gac aca ctg	240
Asp Phe Glu Glu Ala Lys Glu Ile Phe Gln Asn Val Asp Asp Thr Leu	
25 30 35	

gcc ttc tgg tcc aag cac gtc gac ggt gac cag tgc ttg gtc ttg ccc	288
Ala Phe Trp Ser Lys His Val Asp Gly Asp Gln Cys Leu Val Leu Pro	

40	45	50	
ttg gag cac ccg tgc gcc agc ctg tgc tgc ggg cac ggc acg tgc atc Leu Glu His Pro Cys Ala Ser Leu Cys Cys Gly His Gly Thr Cys Ile 55 60 65 70			336
gac ggc atc ggc agc ttc agc tgc gac tgc cgc agc ggc tgg gag ggc Asp Gly Ile Gly Ser Phe Ser Cys Asp Cys Arg Ser Gly Trp Glu Gly 75 80 85			384
cgc ttc tgc cag cgc gag gtg agc ttc ctc aat tgc tcg ctg gac aac Arg Phe Cys Gln Arg Glu Val Ser Phe Leu Asn Cys Ser Leu Asp Asn 90 95 100			432
ggc ggc tgc acg cat tac tgc cta gag gag gtg ggc tgg cgg cgc tgt Gly Gly Cys Thr His Tyr Cys Leu Glu Glu Val Gly Trp Arg Arg Cys 105 110 115			480
agc tgt gcg cct ggc tac aag ctg ggg gac gac ctc ctg cag tgt cac Ser Cys Ala Pro Gly Tyr Lys Leu Gly Asp Asp Leu Leu Gln Cys His 120 125 130			528
ccc gca gtg aag ttc cct tgt ggg agg ccc tgg aag cgg atg gag aag Pro Ala Val Lys Phe Pro Cys Gly Arg Pro Trp Lys Arg Met Glu Lys 135 140 145 150			576
aag cgc agt cac ctg aaa cga gac aca gaa gac caa gaa gac caa gta Lys Arg Ser His Leu Lys Arg Asp Thr Glu Asp Gln Glu Asp Gln Val 155 160 165			624
gat ccg cgg ctc att gat ggg aag atg acc agg cgg gga gac agc ccc Asp Pro Arg Leu Ile Asp Gly Lys Met Thr Arg Arg Gly Asp Ser Pro 170 175 180			672
tgg cag gtg gtc ctg ctg gac tca aag aag aag ctg gcc tgc ggg gca Trp Gln Val Val Leu Leu Asp Ser Lys Lys Lys Leu Ala Cys Gly Ala 185 190 195			720
gtg ctc atc cac ccc tcc tgg gtg ctg aca gcg gcc cac tgc atg gat Val Leu Ile His Pro Ser Trp Val Leu Thr Ala Ala His Cys Met Asp 200 205 210			768
gag tcc aag aag ctc ctt gtc agg ctt gga gag tat gac ctg cgg cgc Glu Ser Lys Lys Leu Leu Val Arg Leu Gly Glu Tyr Asp Leu Arg Arg 215 220 225 230			816
tgg gag aag tgg gag ctg gac ctg gac atc aag gag gtc ttc gtc cac Trp Glu Lys Trp Glu Leu Asp Leu Asp Ile Lys Glu Val Phe Val His 235 240 245			864
ccc aac tac agc aag agc acc acc gac aat gac atc gca ctg ctg cac Pro Asn Tyr Ser Lys Ser Thr Thr Asp Asn Asp Ile Ala Leu Leu His 250 255 260			912
ctg gcc cag ccc gcc acc ctc tcg cag acc ata gtg ccc atc tgc ctc Leu Ala Gln Pro Ala Thr Leu Ser Gln Thr Ile Val Pro Ile Cys Leu 265 270 275			960

ccg gac agc ggc ctt gca gag cgc gag ctc aat cag gcc ggc cag gag	1008
Pro Asp Ser Gly Leu Ala Glu Arg Glu Leu Asn Gln Ala Gly Gln Glu	
280 285 290	
acc ctc gtg acg ggc tgg ggc tac cac agc agc cga gag aag gag gcc	1056
Thr Leu Val Thr Gly Trp Gly Tyr His Ser Ser Arg Glu Lys Glu Ala	
295 300 305 310	
aag aga aac cgc acc ttc gtc ctc aac ttc atc aag att ccc gtg gtc	1104
Lys Arg Asn Arg Thr Phe Val Leu Asn Phe Ile Lys Ile Pro Val Val	
315 320 325	
ccg cac aat gag tgc agc gag gtc atg agc aac atg gtg tct gag aac	1152
Pro His Asn Glu Cys Ser Glu Val Met Ser Asn Met Val Ser Glu Asn	
330 335 340	
atg ctg tgt gcg ggc atc ctc ggg gac cgg cag gat gcc tgc gag ggc	1200
Met Leu Cys Ala Gly Ile Leu Gly Asp Arg Gln Asp Ala Cys Glu Gly	
345 350 355	
gac agt ggg ggg ccc atg gtc gcc tcc ttc cac ggc acc tgg ttc ctg	1248
Asp Ser Gly Gly Pro Met Val Ala Ser Phe His Gly Thr Trp Phe Leu	
360 365 370	
gtg ggc ctg gtg agc tgg ggt gag ggc tgt ggg ctc ctt cac aac tac	1296
Val Gly Leu Val Ser Trp Gly Glu Gly Cys Gly Leu Leu His Asn Tyr	
375 380 385 390	
ggc gtt tac acc aaa gtc agc cgc tac ctc gac tgg atc cat ggg cac	1344
Gly Val Tyr Thr Lys Val Ser Arg Tyr Leu Asp Trp Ile His Gly His	
395 400 405	
atc aga gac aag gaa gcc ccc cag aag agc tgg gca cct	1383
Ile Arg Asp Lys Glu Ala Pro Gln Lys Ser Trp Ala Pro	
410 415	

<210> 2
 <211> 461
 <212> PRT
 <213> Homo sapiens

<220>
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 <222> (1)...(42)

<221> CHAIN
 <222> (43)...(461)

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Ser Gly Thr Pro Ala Pro Leu Asp Ser Val Phe Ser Ser Ser Glu Arg
 -25 -20 -15

Ala His Gln Val Leu Arg Ile Arg Lys Arg Ala Asn Ser Phe Leu Glu
 -10 -5 -1 1 5
 Glu Leu Arg His Ser Ser Leu Glu Arg Glu Cys Ile Glu Glu Ile Cys
 10 15 20
 Asp Phe Glu Glu Ala Lys Glu Ile Phe Gln Asn Val Asp Asp Thr Leu
 25 30 35
 Ala Phe Trp Ser Lys His Val Asp Gly Asp Gln Cys Leu Val Leu Pro
 40 45 50
 Leu Glu His Pro Cys Ala Ser Leu Cys Cys Gly His Gly Thr Cys Ile
 55 60 65 70
 Asp Gly Ile Gly Ser Phe Ser Cys Asp Cys Arg Ser Gly Trp Glu Gly
 75 80 85
 Arg Phe Cys Gln Arg Glu Val Ser Phe Leu Asn Cys Ser Leu Asp Asn
 90 95 100
 Gly Gly Cys Thr His Tyr Cys Leu Glu Glu Val Gly Trp Arg Arg Cys
 105 110 115
 Ser Cys Ala Pro Gly Tyr Lys Leu Gly Asp Asp Leu Leu Gln Cys His
 120 125 130
 Pro Ala Val Lys Phe Pro Cys Gly Arg Pro Trp Lys Arg Met Glu Lys
 135 140 145 150
 Lys Arg Ser His Leu Lys Arg Asp Thr Glu Asp Gln Glu Asp Gln Val
 155 160 165
 Asp Pro Arg Leu Ile Asp Gly Lys Met Thr Arg Arg Gly Asp Ser Pro
 170 175 180
 Trp Gln Val Val Leu Leu Asp Ser Lys Lys Lys Leu Ala Cys Gly Ala
 185 190 195
 Val Leu Ile His Pro Ser Trp Val Leu Thr Ala Ala His Cys Met Asp
 200 205 210
 Glu Ser Lys Lys Leu Leu Val Arg Leu Gly Glu Tyr Asp Leu Arg Arg
 215 220 225 230
 Trp Glu Lys Trp Glu Leu Asp Leu Asp Ile Lys Glu Val Phe Val His
 235 240 245
 Pro Asn Tyr Ser Lys Ser Thr Thr Asp Asn Asp Ile Ala Leu Leu His
 250 255 260
 Leu Ala Gln Pro Ala Thr Leu Ser Gln Thr Ile Val Pro Ile Cys Leu
 265 270 275
 Pro Asp Ser Gly Leu Ala Glu Arg Glu Leu Asn Gln Ala Gly Gln Glu
 280 285 290

Thr Leu Val Thr Gly Trp Gly Tyr His Ser Ser Arg Glu Lys Glu Ala
 295 300 305 310
 Lys Arg Asn Arg Thr Phe Val Leu Asn Phe Ile Lys Ile Pro Val Val
 315 320 325
 Pro His Asn Glu Cys Ser Glu Val Met Ser Asn Met Val Ser Glu Asn
 330 335 340
 Met Leu Cys Ala Gly Ile Leu Gly Asp Arg Gln Asp Ala Cys Glu Gly
 345 350 355
 Asp Ser Gly Gly Pro Met Val Ala Ser Phe His Gly Thr Trp Phe Leu
 360 365 370
 Val Gly Leu Val Ser Trp Gly Glu Gly Cys Gly Leu Leu His Asn Tyr
 375 380 385 390
 Gly Val Tyr Thr Lys Val Ser Arg Tyr Leu Asp Trp Ile His Gly His
 395 400 405
 Ile Arg Asp Lys Glu Ala Pro Gln Lys Ser Trp Ala Pro
 410 415

<210> 3
 <211> 1257
 <212> DNA
 <213> Homo sapiens

<220>
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 <222> (1)..(1257)

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 Cys Ile Glu Glu Ile Cys Asp Phe Glu Glu Ala Lys Glu Ile Phe Gln
 20 25 30
 aat gtg gat gac aca ctg gcc ttc tgg tcc aag cac gtc gac ggt gac 144
 Asn Val Asp Asp Thr Leu Ala Phe Trp Ser Lys His Val Asp Gly Asp
 35 40 45
 cag tgc ttg gtc ttg ccc ttg gag cac ccg tgc gcc agc ctg tgc tgc 192
 Gln Cys Leu Val Leu Pro Leu Glu His Pro Cys Ala Ser Leu Cys Cys
 50 55 60
 ggg cac ggc acg tgc atc gac ggc atc ggc agc ttc agc tgc gac tgc 240
 Gly His Gly Thr Cys Ile Asp Gly Ile Gly Ser Phe Ser Cys Asp Cys
 65 70 75 80
 cgc agc ggc tgg gag ggc cgc ttc tgc cag cgc gag gtg agc ttc ctc 288

Arg	Ser	Gly	Trp	Glu	Gly	Arg	Phe	Cys	Gln	Arg	Glu	Val	Ser	Phe	Leu	
				85					90					95		
aat	tgc	tgc	ctg	gac	aac	ggc	ggc	tgc	acg	cat	tac	tgc	cta	gag	gag	336
Asn	Cys	Ser	Leu	Asp	Asn	Gly	Gly	Cys	Thr	His	Tyr	Cys	Leu	Glu	Glu	
			100					105					110			
gtg	ggc	tgg	cgg	cgc	tgt	agc	tgt	gcg	cct	ggc	tac	aag	ctg	ggg	gac	384
Val	Gly	Trp	Arg	Arg	Cys	Ser	Cys	Ala	Pro	Gly	Tyr	Lys	Leu	Gly	Asp	
		115					120					125				
gac	ctc	ctg	cag	tgt	cac	ccc	gca	gtg	aag	ttc	cct	tgt	ggg	agg	ccc	432
Asp	Leu	Leu	Gln	Cys	His	Pro	Ala	Val	Lys	Phe	Pro	Cys	Gly	Arg	Pro	
	130					135					140					
tgg	aag	cgg	atg	gag	aag	aag	cgc	agt	cac	ctg	aaa	cga	gac	aca	gaa	480
Trp	Lys	Arg	Met	Glu	Lys	Lys	Arg	Ser	His	Leu	Lys	Arg	Asp	Thr	Glu	
	145				150					155					160	
gac	caa	gaa	gac	caa	gta	gat	ccg	cgg	ctc	att	gat	ggg	aag	atg	acc	528
Asp	Gln	Glu	Asp	Gln	Val	Asp	Pro	Arg	Leu	Ile	Asp	Gly	Lys	Met	Thr	
			165						170					175		
agg	cgg	gga	gac	agc	ccc	tgg	cag	gtg	gtc	ctg	ctg	gac	tca	aag	aag	576
Arg	Arg	Gly	Asp	Ser	Pro	Trp	Gln	Val	Val	Leu	Leu	Asp	Ser	Lys	Lys	
			180				185						190			
aag	ctg	gcc	tgc	ggg	gca	gtg	ctc	atc	cac	ccc	tcc	tgg	gtg	ctg	aca	624
Lys	Leu	Ala	Cys	Gly	Ala	Val	Leu	Ile	His	Pro	Ser	Trp	Val	Leu	Thr	
		195					200					205				
gcg	gcc	cac	tgc	atg	gat	gag	tcc	aag	aag	ctc	ctt	gtc	agg	ctt	gga	672
Ala	Ala	His	Cys	Met	Asp	Glu	Ser	Lys	Lys	Leu	Leu	Val	Arg	Leu	Gly	
	210					215					220					
gag	tat	gac	ctg	cgg	cgc	tgg	gag	aag	tgg	gag	ctg	gac	ctg	gac	atc	720
Glu	Tyr	Asp	Leu	Arg	Arg	Trp	Glu	Lys	Trp	Glu	Leu	Asp	Leu	Asp	Ile	
	225				230				235						240	
aag	gag	gtc	ttc	gtc	cac	ccc	aac	tac	agc	aag	agc	acc	acc	gac	aat	768
Lys	Glu	Val	Phe	Val	His	Pro	Asn	Tyr	Ser	Lys	Ser	Thr	Thr	Asp	Asn	
			245						250					255		
gac	atc	gca	ctg	ctg	cac	ctg	gcc	cag	ccc	gcc	acc	ctc	tgc	cag	acc	816
Asp	Ile	Ala	Leu	Leu	His	Leu	Ala	Gln	Pro	Ala	Thr	Leu	Ser	Gln	Thr	
			260					265					270			
ata	gtg	ccc	atc	tgc	ctc	ccg	gac	agc	ggc	ctt	gca	gag	cgc	gag	ctc	864
Ile	Val	Pro	Ile	Cys	Leu	Pro	Asp	Ser	Gly	Leu	Ala	Glu	Arg	Glu	Leu	
		275					280					285				
aat	cag	gcc	ggc	cag	gag	acc	ctc	gtg	acg	ggc	tgg	ggc	tac	cac	agc	912
Asn	Gln	Ala	Gly	Gln	Glu	Thr	Leu	Val	Thr	Gly	Trp	Gly	Tyr	His	Ser	
		290				295					300					
agc	cga	gag	aag	gag	gcc	aag	aga	aac	cgc	acc	ttc	gtc	ctc	aac	ttc	960
Ser	Arg	Glu	Lys	Glu	Ala	Lys	Arg	Asn	Arg	Thr	Phe	Val	Leu	Asn	Phe	

305	310	315	320	
atc aag att ccc gtg gtc ccg cac aat gag tgc agc gag gtc atg agc				1008
Ile Lys Ile Pro Val Val Pro His Asn Glu Cys Ser Glu Val Met Ser				
	325	330	335	
aac atg gtg tct gag aac atg ctg tgt gcg gcc atc ctc ggg gac cgg				1056
Asn Met Val Ser Glu Asn Met Leu Cys Ala Gly Ile Leu Gly Asp Arg				
	340	345	350	
cag gat gcc tgc gag gcc gac agt ggg ggg ccc atg gtc gcc tcc ttc				1104
Gln Asp Ala Cys Glu Gly Asp Ser Gly Gly Pro Met Val Ala Ser Phe				
	355	360	365	
cac gcc acc tgg ttc ctg gtg gcc ctg gtg agc tgg ggt gag gcc tgt				1152
His Gly Thr Trp Phe Leu Val Gly Leu Val Ser Trp Gly Glu Gly Cys				
	370	375	380	
ggg ctc ctt cac aac tac gcc gtt tac acc aaa gtc agc cgc tac ctc				1200
Gly Leu Leu His Asn Tyr Gly Val Tyr Thr Lys Val Ser Arg Tyr Leu				
	385	390	395	400
gac tgg atc cat ggg cac atc aga gac aag gaa gcc ccc cag aag agc				1248
Asp Trp Ile His Gly His Ile Arg Asp Lys Glu Ala Pro Gln Lys Ser				
	405	410	415	
tgg gca cct				1257
Trp Ala Pro				

<210> 4
 <211> 419
 <212> PRT
 <213> Homo sapiens

<400> 4
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 20 25 30
 Asn Val Asp Asp Thr Leu Ala Phe Trp Ser Lys His Val Asp Gly Asp
 35 40 45
 Gln Cys Leu Val Leu Pro Leu Glu His Pro Cys Ala Ser Leu Cys Cys
 50 55 60
 Gly His Gly Thr Cys Ile Asp Gly Ile Gly Ser Phe Ser Cys Asp Cys
 65 70 75 80
 Arg Ser Gly Trp Glu Gly Arg Phe Cys Gln Arg Glu Val Ser Phe Leu
 85 90 95
 Asn Cys Ser Leu Asp Asn Gly Gly Cys Thr His Tyr Cys Leu Glu Glu
 100 105 110

Val Gly Trp Arg Arg Cys Ser Cys Ala Pro Gly Tyr Lys Leu Gly Asp
115 120 125
Asp Leu Leu Gln Cys His Pro Ala Val Lys Phe Pro Cys Gly Arg Pro
130 135 140
Trp Lys Arg Met Glu Lys Lys Arg Ser His Leu Lys Arg Asp Thr Glu
145 150 155 160
Asp Gln Glu Asp Gln Val Asp Pro Arg Leu Ile Asp Gly Lys Met Thr
165 170 175
Arg Arg Gly Asp Ser Pro Trp Gln Val Val Leu Leu Asp Ser Lys Lys
180 185 190
Lys Leu Ala Cys Gly Ala Val Leu Ile His Pro Ser Trp Val Leu Thr
195 200 205
Ala Ala His Cys Met Asp Glu Ser Lys Lys Leu Leu Val Arg Leu Gly
210 215 220
Glu Tyr Asp Leu Arg Arg Trp Glu Lys Trp Glu Leu Asp Leu Asp Ile
225 230 235 240
Lys Glu Val Phe Val His Pro Asn Tyr Ser Lys Ser Thr Thr Asp Asn
245 250 255
Asp Ile Ala Leu Leu His Leu Ala Gln Pro Ala Thr Leu Ser Gln Thr
260 265 270
Ile Val Pro Ile Cys Leu Pro Asp Ser Gly Leu Ala Glu Arg Glu Leu
275 280 285
Asn Gln Ala Gly Gln Glu Thr Leu Val Thr Gly Trp Gly Tyr His Ser
290 295 300
Ser Arg Glu Lys Glu Ala Lys Arg Asn Arg Thr Phe Val Leu Asn Phe
305 310 315 320
Ile Lys Ile Pro Val Val Pro His Asn Glu Cys Ser Glu Val Met Ser
325 330 335
Asn Met Val Ser Glu Asn Met Leu Cys Ala Gly Ile Leu Gly Asp Arg
340 345 350
Gln Asp Ala Cys Glu Gly Asp Ser Gly Gly Pro Met Val Ala Ser Phe
355 360 365
His Gly Thr Trp Phe Leu Val Gly Leu Val Ser Trp Gly Glu Gly Cys
370 375 380
Gly Leu Leu His Asn Tyr Gly Val Tyr Thr Lys Val Ser Arg Tyr Leu
385 390 395 400
Asp Trp Ile His Gly His Ile Arg Asp Lys Glu Ala Pro Gln Lys Ser
405 410 415

Trp Ala Pro

<210> 5
<211> 44
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 5
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<210> 6
<211> 44
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 6
ccccgcctgg tcattctccc gttaatgagc cgcggatcta ctg 44

<210> 7
<211> 45
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 7
ctgacagcgg ccactgcat gaacgagtcc aagaagctcc ttgtc 45

<210> 8
<211> 45
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 8
gacaaggagc ttcttggact cgttcatgca gtgggccgct gtcag 45

<210> 9
<211> 45
<212> DNA
<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer

<400> 9

ctgacagcgg cccactgcat ggccgagtc aagaagctcc ttgtc

45

<210> 10

<211> 45

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer

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45

<210> 11

<211> 46

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer

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46

<210> 12

<211> 46

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer

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46

<210> 13

<211> 45

<212> DNA

<213> Artificial Sequence

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<223> Description of Artificial Sequence: Primer

<400> 13

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45

<210> 14

<211> 45

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer

<400> 14

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<210> 15

<211> 47

<212> DNA

<213> Artificial Sequence

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<223> Description of Artificial Sequence: Primer

<400> 15

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<210> 16

<211> 47

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer

<400> 16

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<210> 17

<211> 38

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer

<400> 17

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<210> 18

<211> 38

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer

<400> 18

gcatgttctc agacacgttg ttgctcatga cctcgctg 38

<210> 19
 <211> 39
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Description of Artificial Sequence: Primer

 <400> 19
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 <210> 20
 <211> 39
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Description of Artificial Sequence: Primer

 <400> 20
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 <210> 21
 <211> 50
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Description of Artificial Sequence: Primer

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 <210> 22
 <211> 50
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Description of Artificial Sequence: Primer

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 <210> 23
 <211> 50
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Description of Artificial Sequence: Primer

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<210> 24
<211> 45
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 24
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<210> 25
<211> 49
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 25
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<210> 26
<211> 51
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 26
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<210> 27
<211> 42
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 27
gtcctgctgg actcaaaca gaccctggcc tgcggggcag tg 42

<210> 28
<211> 42
<212> DNA
<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer

<400> 28
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<210> 29
<211> 48
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 29
gcatggatga gtccaacaag acccttgatca ggcttggaga gtatgacc 48

<210> 30
<211> 48
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 30
ggtcatactc tccaagcctg acaagggtct tgttggactc atccatgc 48

<210> 31
<211> 50
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

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<210> 32
<211> 52
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 32
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<210> 33
<211> 48
<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer

<400> 33

ggctggggct accacagcaa ccgaaccaag gaggccaaga gaaaccgc 48

<210> 34

<211> 48

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer

<400> 34

gcggtttctc ttggcctcct tggttcggtt gctgtggtag cccagcc 48

<210> 35

<211> 49

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer

<400> 35

ggctaccaca gcagccgaaa caagaccgcc aagagaaacc gcaccttcg 49

<210> 36

<211> 49

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer

<400> 36

cgaaggtgcg gtttctcttg gcggtcttgt ttcggctgct gtggtagcc 49

<210> 37

<211> 49

<212> DNA

<213> Artificial Sequence

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<223> Description of Artificial Sequence: Primer

<400> 37

gcagcgaggt catgaacaac accgtgtctg agaacatgct gtgtgcggg 49

<210> 38
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 <213> Artificial Sequence

 <220>
 <223> Description of Artificial Sequence: Primer

 <400> 38
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 <210> 39
 <211> 52
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 <213> Artificial Sequence

 <220>
 <223> Description of Artificial Sequence: Primer

 <400> 39
 ggtgagctgg ggtgagggct gtgggaacct taccaactac ggcgtttaca cc 52

 <210> 40
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 <220>
 <223> Description of Artificial Sequence: Primer

 <400> 40
 ggtgtaaacy ccgtagttgg taagggtccc acagccctca cccagctca cc 52

 <210> 41
 <211> 6
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 <220>
 <223> Description of Artificial Sequence: peptide tag

 <400> 41
 His His His His His His
 1 5

 <210> 42
 <211> 8
 <212> PRT
 <213> Artificial Sequence

 <220>
 <223> Description of Artificial Sequence: peptide tag

<400> 42

Met Lys His His His His His His

1 5

<210> 43

<211> 10

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: peptide tag

<400> 43

Met Lys His His Ala His His Gln His His

1 5 10

<210> 44

<211> 14

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: peptide tag

<400> 44

Met Lys His Gln His Gln His Gln His Gln His Gln

1 5 10

<210> 45

<211> 15

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: peptide tag

<400> 45

Met Lys His Gln His Gln His Gln His Gln His Gln Gln

1 5 10 15

<210> 46

<211> 10

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: peptide tag

<400> 46

Glu Gln Lys Leu Ile Ser Glu Glu Asp Leu

1 5 10

<210> 47
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: peptide tag

<400> 47
Asp Tyr Lys Asp Asp Asp Asp Lys
1 5

<210> 48
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: peptide tag

<400> 48
Tyr Pro Tyr Asp Val Pro Asp Tyr Ala
1 5